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West Europe Report

SCIENCE AND TECHNOLOGY

(FOUO 7/81)



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CHEMICALS

COMPANIES PURSUING JOINT EFFORTS IN COMPOSITES FIELD

Paris AIR & COSMOS 16 May 81 p 37

[Article by Pierre Langereux: "French Carbon Fiber Industry Organized. SEP Concludes an Agreement With ELF-Aquitaine..."]

[Text] European Propellant Co. [SEP] and the French national petroleum company ELF-Aquitaine have just concluded a "wide-ranging cooperation agreement" in the field of carbon fiber composites.

The agreement concluded 7 May by Pierre Soufflet, president of SEP, and Michel Schneider-Maunoury, director of chemistry and industrial development at ELF, deals with "efforts in research, development, fabrication, and commercialization" of these composite materials which are already being used in the aerospace and ballistic sectors. It covers all types of carbon fiber composites--both carbon-resin structural composites and carbon-carbon multidirectional composites--and the constituents (carbon fibers and resins) used in fabricating these materials. It also covers the rubber-carbon composite laminates, but excludes the elastomer-metal laminates.

To this joint undertaking, SEP will bring primarily its technical experience, notably in the stages of research development and implementation. On the other hand, ELF will provide the industrial and financial resources by virtue of a volume of Fr 75 billion of business) permitting the launching of large-scale production of composites and carbon fibers.

This skeleton agreement, for a 3-year period (renewable), in fact should lead to the establishment of "joint production units" providing a capacity to respond to the rapid development of new markets for these advanced materials. Specific agreements are then to be concluded between SEP and ELF for installation of production units suited to the various civil applications; the military applications of the SEP carbon fiber composites will remain under SEP control. ELF has already indicated some needs in the petroleum and energy sectors (tubes, pressure vessels, etc.), but important outlets for carbon fiber composites may be found in other fields such as the automobile industry. Recall that SEP also signed an agreement in 1980 for technical cooperation with Peugeot S.A.

As part of its effort in advanced-technology materials, ELF has already planned to set up a production unit for carbon fibers and resins. In its own laboratories the company will develop special matrix resins for the composites. Recall that ELF

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recently took over M & T Chemicals, a U.S. company specializing in resins. ELF also plans to establish a production unit for carbon fibers in France. Negotiations with several foreign companies to obtain a license for manufacture of carbon fibers in association with an already-established producer (Japanese, British, or American) are currently in progress. As for carbon-carbon composites, recall that SEP already manufactures these materials (SEPCARB) at the Haillan factory, whose production capacity (10 to 15 tons/year) could be expanded.

For SEP, this agreement with ELF constitutes the first step in a strategy of expansion into the field of composite materials which should enable to aerospace firm to break into new sectors of industry and benefit from more extensive industrialization of its products.

Furthermore, SEP is presently negotiating new agreements with other companies, notably in the United States, concerning related materials, such as ceramic composites (CERASEP), for which SEP is prepared to authorize a strong industrial effort with support from public authorities.

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ENERGY

BELGIAN-GERMAN IN SITU COAL GASIFICATION PROJECT PROCEEDS

Hamburg ERDOEL & KOHLE-ERDGAS-PETROCHEMIE in German Apr 81 p 148

[Article by H. Bartenstein: "In Situ Coal Gasification"]

[Text] Included in the 1980 Status Report on Geotechnology and Deposits, Volume 2, is a report on the planning and status of the Belgian-German field trial on in situ gasification of coal, Research Project ET 10 15 D. The experiment is under the direction of P. Ledent and Chr. P. Beckervordersandforth. The present state of development is as follows:

In April 1979 a project group in Liege started work aimed at bringing closer to realization the agreement concluded on 1 October 1976 between the Belgian and FRG Governments for joint technological development of in situ gasification. The EEC will assume 40 percent of the expenses of the first test phase, primarily because the test is intended to make possible economical utilization of the coal deposits in Northwest Europe which can no longer be mined.

The first exploratory borehole, Thulin 1, which was sunk in 1977 to a depth of almost 1,000 meters in the South Belgian Coal Basin near the city of Mons, was intended to test the geological prerequisites for successful execution of the gasification project. At depths of 861.5 to 868.35 meters in the Leopold-Charles seam area, the following layers were found and analyzed: seam thickness 6.85 meters, actual coal thickness 4.15 meters, tailings thickness 2.70 meters. Three additional boreholes are to be sunk by the study group Saarberg-Interplan GmbH/Thyssen Schachtbau [Saarberg-Interplan, Ltd./Thyssen Mine Shaft Construction]. Moreover, an aboveground plant for the supply of gasification agents and for preparation of the gases produced will be built with engineering under the responsibility of Coppee-Rust. The entire installation is to go into operation in November 1981, the first phase of the test being trials of the technique of reverse combustion of coal for channel formation. This installation is designed for the following orders of magnitude: high-pressure air compressor 12,500 normal cubic meters per hour, 45 bars; steam generator 20 metric tons [per hour], 50 bars; raw gas preparation 20,000 normal cubic meters per hour.

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ENERGY

BRIEFS

COAL GASIFICATION DEMONSTRATION PLANT--The Rheinische Braunkohlenwerke AG [Rhine Brown Coal Works, Inc.], Cologne, intends to construct a demonstration plant in the Rhine Brown Coal Basin to produce synthesis gases from brown coal at elevated pressure and at high temperatures according to the "Rheinbraun-High Temperature-Winkler Process" (HTW). (The process is also suitable for the production of hydrogen, reducing gas, or low BTU gas.) Uhde GmbH [Uhde, Ltd.], Dortmund, is responsible for the project engineering of this demonstration plant, which is designed for a capacity of 1 billion cubic meters per year of synthesis gas. This quantity of gas is supposedly sufficient for production of 1,000 tons per day of methanol. To begin with, only one train will be constructed, producing one-fourth of this capacity. Commissioning is planned for 1983-1984. The synthesis gas will be pumped through a pipeline to the plant at Wesseling of Union Rheinische Braunkohlen Kraftstoff AG [Union Rhine Brown Coal & Motor Fuel, Inc.], where it will replace methanol synthesis gas now produced by gasification of residual crude. By the end of World War II it had already been shown at Leuna that brown coal is particularly suited for the production of refined coal products. More recent economic studies have confirmed that synthesis gas produced by the HTW process from brown coal is cheaper than synthesis gas from heavy oil or from natural gas. At present, Rhine brown coal is preponderantly used for electric current production. The preceding statements show how important it would be for the national economy to relieve the pressure on brown coal through intensive development of nuclear energy and to make available increased quantities of brown coal for refining in the future. [Text] [Hamburg ERDOEL & KOHLE-ERDGAS-PETROCHEMIE in German Apr 81 p 150] [COPYRIGHT: Industrieverlag von Hernhaussen KG, Hamburg 1981] 5586

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TRANSPORTATION

CURRENT PROGRAMS, PROJECTS SHOWN, DISCUSSED AT LE BOURGET

A320 Program Announced

Paris AIR & COSMOS in French 13 Jun 81 p 24

[Article: "The A320 Program Begins"]

[Text] "The 150-seat A320 airplane program has begun," Bernard Lathiere, managing director of Airbus Industrie, announced within an hour of the Salon's opening. The board of directors of Airbus Industrie in fact gave directives to this effect to the consortium. This decision arises from commercial motives, not from political ones. "A political civil airplane is no longer being built," Lathiere said.

Roger Beteille explained the conditions under which each Airbus Industrie partner has been closely associated with the preliminary design phase of the A320 program. Lathiere emphasized that the engines which will be selected for the new airplane will be the most modern of the next decade, adding that it is the airlines which will decide which engines are selected.

It is estimated that development of the new airplane will require that \$2 billion (1981 prices) worth of orders be placed. The unit price of the new airplane will be between \$20 million and \$25 million. Airbus Industrie will be able to begin deliveries in March 1986. But, naturally, definite commitments will not be made until the first airlines will have made firm commitments. It can, in fact, be predicted that the start-up conditions for the new airplane will be closely comparable to those which prevailed for the start-up of the A310 where simultaneous commitments by the German Lufthansa, Swissair, and Air France were the deciding factor.

Franck [sic] Borman, president of Eastern Airlines, who was present at the Airbus Industrie press conference, in response to a question by AIR & COSMOS said that his airline was now giving priority attention to the program for the 150-seat airplane, which is very efficient from the standpoint of fuel consumption, but that problem with the cost will be equally decisive as far as actual placing of orders is concerned. Borman emphasized that problems posed by deregulation are making the airlines very cautious but that it is also because of these problems that priority over the TA 11/12 is being given to the A310. Several times during the conference Bernard Lathiere reiterated that it is the market which will decide what will be built.

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Lathiere believes that in the market for the 150-seat airplane there will be room for only three manufacturers and that in fact it is the first manufacturer actually to start, Airbus Industrie, and Boeing which will capture this market.

Questioned about the break-even point for the Airbus A300/310 program, Lathiere stated that with the Airbus No 360 Airbus Industrie should have repaid to the various governments the loans granted for development of the A300. If later manufacturing costs, and expenses related to the A310 program, are taken into account, the break-even point for the Airbus program is now about 900 airplanes. But, Lathiere states, the requirements of the 40 airlines which have ordered Airbus airplanes are for a total very close to 900 airplanes. For the first time a European live jet aircraft program is indeed going to break even and this prospect is of considerable importance at the very time that Airbus Industrie is to commit itself to new programs: first, the A320, and then the TA9 and TA 11/12.

More Details on A 320

Paris AIR & COSMOS in French 13 Jun 81 p 33

[Excerpt] Airbus Industrie Shows Its Colors

The strategy of Airbus Industrie is to be resolutely on the offensive; in his press conference on Friday, 5 June, Roger Beteille and his associates revealed the characteristics of the future A320 (formerly the SA/1SA2), which can be delivered starting in March 1986, and study of which has been largely begun by Airbus Industrie and its partners. Compared to a B727-200 the airplane should consume 40 percent less fuel and thus provide a direct operating cost lower by 20 to 25 percent; compared to the B737-200 the corresponding figures are 30/35 percent and 18/20 percent [respectively]. Actually this is what is attractive to future customers for replacement of their fleets.

Two versions of the airplane which have already been announced are being started simultaneously: the A320-100 (154 seats uniformly spaced 32 inches apart) and the A320-200 (172 seats under like conditions); the flying range, depending upon the version, will be between 1,600 nautical miles (2,960 km) and 2,200 nautical miles (4,075 km).

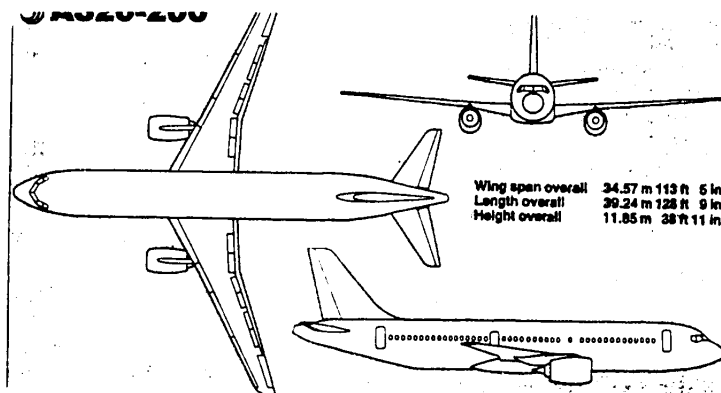
The advantages of an entirely new airplane (whereas Boeing has announced an airplane more or less derived from the B757) are evident: the fuselage section can be chosen to provide greater comfort and better facilities for carrying containers under the floor; utilization of advanced techniques is facilitated; and the airplane can better incorporate future developments, as far as engines are concerned as well as possible increase in capacity.

Dimensions and Weights of the Two Versions of the A320

	A320-100	A320-200
Overall length (meters)	36.04	39.24
Wing span (meters)	34.57	34.57
Maximum weight at take-off (kg)	66,000	71,900

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Maximum weight on landing (kg)	60,700	65,700
Maximum weight without fuel (kg)	54,900	60,400
Operational weight empty (kg)	38,478	40,835
Maximum payload (kg)	16,422	19,565
Passenger load (kg)	13,971	15,604
Cargo load (kg)	2,451	3,961
Number of seats (spaced at 32 inches)	154	172
Capacity of cargo compartments (cubic meters)	38.7	48.2
Capacity of tanks (kg)	18,800	18,800



Shape of the future A 320 ("200" version)

SNECMA Engines

Paris AIR & COSMOS in French 13 Jun 81 p 37

[Article: "Industrial Mobilization for SNECMA (National Aircraft Engine Study and Manufacturing Company) Programs"]

[Excerpts] At Le Bourget last Tuesday Rene Ravand, president of SNECMA, confirmed the operating results of the national company for the year 1980 (sales volume: 3,485 million francs, an increase of 16.5 percent; profit: 57 million francs) and reminded that the SNECMA group now employs about 20,000.

The SNECMA president emphasized several times the importance of personnel consensus, expressed, notably, through the Enterprise Central Committee, the major manufacturing decisions of his company.

As far as civil engines are concerned, Ravand recalled the cooperation with General Electric in the CF6 50 program for the Airbus A300 (80 percent of those airplanes are equipped with this engine model), in the CF 6 80 C for the A300-600, and in the CF 6 81 for the A 310, and also recalled that the CF 6 82 had to be stopped as was previously the case with the M 45 in order to cut financial losses. He then cited the use of CFM 56 model 2 engines (engine replacement for the DC-8 60 and KC 135--this market is capable of attaining a volume of up to \$14 billion), of model 3 (engines for the 737-300 and engine replacement for the

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DC 9 50 and even for some Super DC 9 airplanes), and of model 2000 (engines for 150-seat airplanes); these should benefit from the experience gained (10 million flying hours) with the first generation CFM 56.

Near 5,000 Subcontractors

All this production necessitates an enormous industrial mobilization effort and SNECMA now has nearly 5,000 subcontractors, of which 4,300 are in France, 350 in the United States, and 300 in Europe and the rest of the world. SNECMA has thus just placed its first orders to the Greek and Indian (Hindustan Aircraft, Ltd) industries. With the latter it is for parts of the 9K 50 while awaiting orders related to the M53 P2.

In response to questions from reporters Ravand emphasized the relations between civil and military production and showed that a mutual balance is indispensable and has consequences at the technical, manufacturing and financial levels.

The CFM 56-2000 for 1986

Questioned about the CFM 56-2000, Ravand stated that the specifications for this engine have not yet been perfected but it may be estimated that the cost of its development will stay below \$1 billion. The financing problems related to this program must be discussed with the new French Government. Start-up of this program is dependent upon orders from a significant number of airlines, for example, two American and two European. If the new program is started at the end of this year the new engine could be available starting at the end of 1986.

SNECMA is conducting studies of turboprops, particularly on the basis of the CFM 56 (20,000 horsepower turboprop) but Ravand believes that at present, and for the relatively distant future, this type of engine, driving a "propfan," will not be used for airplanes carrying more than 70 or 80 passengers.

Asked about nationalization, Ravand emphasized that SNECMA is administered as a private company and is in very rough competition with commercial companies. SNECMA personnel is fully aware of this environment.

Commuter Aircraft Make Debuts

Paris AIR & COSMOS in French 13 Jun 81 pp 44-45

[Article by R. Noye: "Commuter Aircraft: Impressive First Showings"]

[Excerpts] Without any doubt at all it was the first time that the airplanes designated "commuter" held such a large place at the Le Bourget Salon and that the number of competitors listed there was so large. This constitutes good proof that the "lively battle of the commuters," to which we alluded in our preceding issue, is underway with the objective of a market which, it will be remembered, amounts to several thousand airplanes.

Besides the presence of representative examples of almost all airplanes now in service throughout the world (Fokker F-27, DHC 8 Twin Otter and DHC 7, EMB-110, Bandeirante, Shorts 330, CASA 212-200, Nomad 24A, and BN-2 MK III "Trislander")

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those shown for the first time at the Salon (H5 748-2B, Gulfstream G-1C, and BN-2T "Turbure Islander") as well as those simply making their first public appearance (Dormier 228-100 and 200, Shorts 380, and Swearingen Metro III) were numerous. In addition, during several press conferences many manufacturers focused upon the status of progress on the principal programs under development and were able to announce their first official orders, while indeed hoping that orders were going to multiply before the Salon closed. Also to be noted was the presence of very fine scale models of cabin arrangements (ATR 42, SF 340, Jetstream 31, etc) and, for the first time for some of them, reduced scale models of major projects as they are now defined by the manufacturers (ATR 42, DHC 3, CN-235, SF 340, and EMB-120 "Brasilla"). Also to be seen at Alfa Romeo's stand was a mock-up of the Partenavia P 78 (14 seats) which is to be equipped with two RB318 turboprops.

ATR 42

One of the great novelties at the Salon beyond any doubt was the full size Model of the interior arrangement of 42 seats, spaced 32 inches apart, of the ATR 42 shown in still photographs by Aerospatiale [National Aerospace Manufacturing Company] and Aeritalia. This model in fact showed the willingness of the two companies to position themselves in the commuter airplace market and but a few hours after the opening of the Salon it had already had considerable commercial impact. By 8 June 25 airlines in fact had manifested interest in the ATR 42--amounting to requirements for 200 airplanes. The decision to start the program, which remains dependent upon specific commitments, could thus be made during the month of October, with the planned date for the airplane's entry into service being the second half of 1985. At this time the division of work, from the production as well as the development standpoint, is already known: Aerospatiale will be responsible for fabrication of the wings as well as the final assembly and flight testing while the Italian manufacturer will construct the fuselage. Extension of cooperation to other European or American partners is also contemplated. In the morning of 8 June an agreement in principle was concluded between the two firms and Pratt and Whitney of Canada for equipping the ATR 42 with 1,800-horsepower P&W 100/2 engines. The choice of this model engine will permit later development of elongated versions of the airplane in order to achieve capacity of 50 or 70 seats.

SF-340

Four important facts marked the press conference given by A.R. Buley, director of the American-Swedish SAAB-Fairchild 340 program:

A new version, designated the "5A" of the General Electric CT7 turoprop, has been chosen for the commuter version (34 seats) of the SF-340; power level 1,675 horsepower. The result is better performance of the aircraft at take-off, in climbing and in cruising and at the same time permitting an increase of 1,000 lbs (453 kg) in its maximum weight without fuel (to 28,000 lbs (10,433 kg) and in its maximum weight on take-off (26,000 lbs or 11,734 kg). It is another version, the 5E of the CT7 with 30 horsepower less power, with which the "executive" version of the SF-340 will be equipped;

A Collins avionics system entirely based upon utilization of cathode display tubes (see page 71 of this issue) has been chosen;

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It was confirmed that the airplane's development is proceeding in accordance with the established program, the wind tunnel tests having now ended--these represented more than 1,000 hours of testing--and the first metal panels intended for the 01 prototype in the process of being milled: it is scheduled to emerge from the shop in November 1982; and

It was announced that American certifications should be received at the same time as European certification (in conformity with the new JAR standards common to 11 countries), during the first quarter of 1984, not long after Swedish approval.

More than 100 SF-340 airplanes have now been ordered, including 25 in the executive version, by more than 25 airlines of all continents except Africa, representing sales in the amount of \$450 million. Starting in the first quarter of 1984 and throughout the year 24 airplanes will be delivered; the maximum production rate planned being seven per month.

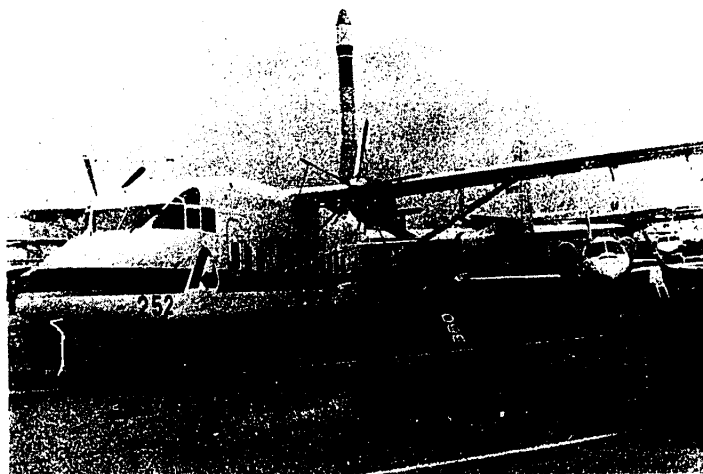
Metro III Certification

Swearingen announced the certification of the Metro III commuter version (19 passengers) of the Merlin IVC and in fact is a modernization of the former Metro IIA and its adaptation to the now SFAR standards 41 of the FAA as well as those of Supplement 6 of the ICAO. Actually the Metro III is 3 meters longer than its predecessor and its wing span has been increased by 3.35 meters to 17.37 meters (wing surface 28.71 square meters instead of 25.73 square meters). It is equipped with new Garrett A/Research TPE 331-11U-601G turboprops of 1,000 horsepower each, which give it better performance as well as appreciably greater maximum weight and payload (14,000 lbs or 6,350 kg and 5,463 lbs or 2,478 kg, respectively). Its flying range with 19 passengers and their baggage is now 1,150 km (maximum cruising speed 510 km per hour). We shall return later on to the Metro which, in addition, shows other improvements at the systems and safety levels. The airplane which was displayed is the first unit and was delivered across the Atlantic, intended for the Swiss Crossair Airline. Its price is \$2.045 million; it is being manufactured at the rate of six per month.

Shorts 360

In bringing the 01 prototype of the Shorts 360 (36 seats) to Le Bourget the Irish manufacturer beyond any doubt accomplished a remarkable feat. As a matter of fact the airplane had made its first flight on Monday, 1 June (6 months ahead of the scheduled date) and it was at the end of 7 hours of testing in 2 days that it crossed the English Channel to be shown on the ground during the Salon. It had then flown a total of only 10 hours. In the course of these tests all aspects of flight were partially covered; the airplane attained speed of 315 km per hour and altitude of 11,000 feet (3,353 meters); its behavior proved excellent. At the Salon's opening Short announced, on the one hand, selection of a completely digital Collins avionics system and, on the other hand, a total of 11 initial orders coming from four airlines. Orders were expected before 14 June.

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The prototype of the Shorts 360 arrived at the Salon in the evening of 3 June, hardly 48 hours after its first flight. It was shown alongside a Model 330.

Jetstream 31

British Aerospace also announced initial orders for the Jetstream 31 (18-19 passengers) the prototype of which, not shown at the Salon, is now continuing its flight tests which commenced in March 1980. The American airline, Mall Airways, Inc., has in fact ordered two airplanes to be delivered, starting in July 1982, and taken options for two more, while the German airline, Contractair, will acquire one airplane to be delivered in the beginning of 1983, and has taken options for two. This represents an initial total of 5 million pounds sterling. Remember that American and British certification of the Jetstream 31 is planned for the middle of 1982, to be following soon thereafter by the first deliveries.

Italian Contribution

Paris AIR & COSMOS in French 13 Jun 81 p 51

[Article: "The Alfa Romeo AR-318 Turboprop for Equipping the Partenavia P-78"]

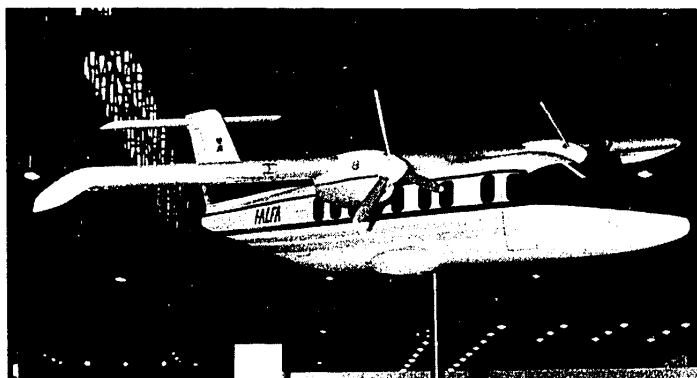
[Text] The mock-up of a feeder airline airplane equipped with two turboprops was shown at the stand of the Italian engine manufacturers, Alfa Romeo Avio. The airplane is the P-78, a Partenavia project upon which Prof Pascale has for a relatively very long time been working at its Naples plant. The engine is the AR-318, designed initially by Alfa Romeo and Rolls Royce jointly, and for study and development of which Alfa Romeo Avio is now the general contractor.

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The P-78, if it is started--and no doubt a decision to this effect will be made before the end of the year--will signify the entry of the Italian manufacturer into the worldwide market for "commuter" aircraft with an airplane derived from the well-known and extensively proven P-68, with very economical operating costs, and very easy to maintain.

In its broad outlines the P-78 is an airplane of 14 or 15 seats (crew included) fully suitable for regional transport. With maximum empty weight of 2,430 kg the plane would have maximum take-off weight of 4,000 kg. It should be certified in accordance with specifications conforming to the FAR and SFAR, Part 23. Its maximum speed should be 415 km per hour and its cruising speed 350 km per hour.



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TRANSPORTATION

DUTCH GOVERNMENT PROMISES 800 MILLION GUILDER FOR MDF-100

[Paris AIR & COSMOS in French 23 May 81 pp 9, 52]

[Text] Hans Wiegel, assistant prime minister of the Dutch government, announced last week that authorities in the Hague are ready to make 800 million guilder available to Fokker for launching the 150-seat MDF-100 twin jet airliner project which Fokker is considering jointly with McDonnell Douglas. This aid was justified by the contribution which the new program will make to the job situation, and by the stimulating role which Fokker plays with respect to the industry and economy of the Netherlands. The form which this aid will take has not yet been determined, but it is thought that there will be loans similar to those Fokker received for the F27 and F28 projects. It must be noted however, that the government which has made this commitment has only a few days to remain in office, since legislative elections are to take place next Tuesday in Holland.

Total Investment of 2 Billion Dollars

At the same time it is noted that the promised sum does not quite amount to half the initial investment, evaluated at about 2 billion guilder, which Fokker and McDonnell Douglas must allow for developing the MDF-100 and building three prototypes. Actual launching of the project, involving documentation and installation of tooling, is estimated at 2 billion dollars or over 5 billion guilder. This is a much larger sum on the part of the Dutch than is actually planned at present by authorities in the Netherlands. The figure includes a double assembly line: one at McDonnell Douglas and one at Fokker, a redundancy which significantly increases the program's cost and which the manufacturers may have to eliminate when they must set their prices under customer pressure.

Understandably, before taking such a financial risk, the builders want to surround themselves with a maximum of guarantees. There will be preliminary studies and market studies, at an approximate cost of 50 million dollars by overseas estimates. Market estimates also vary from 1000 to 2000 aircraft. But it must be remembered that between Delta (100), United (150), and Eastern (100), the initial market amounts to 350 planes. In addition to McDonnell Douglas and Fokker, Boeing and Airbus Industrie have proposals to make: the 7-7 and the A 320, respectively. But

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financial circles estimate that since there is no room for three builders on such a difficult market, one at least of the three projects will be eliminated. McDonnell Douglas, which until now had seemed rather reserved after losses over the past four years, evaluated at 310 million dollars, in connection with its commercial planes, now seems more determined to go ahead.

Japan Solicited

For each of the three competing builders, however, the green light for the 150-seat plane depends on the number of launching companies which each will be able to enlist, and also on the collaborators each will be able to recruit in order to share risks. It is noted that Francois Swartlow, general manager at Fokker, was already in Tokyo on 9 May, making a presentation to authorities (MITI) and to Japanese builders about circumstances surrounding his decision to drop a cooperation project with Boeing in favor of one with McDonnell Douglas, and also making attempts to gain Japanese participation. Mr Swartlow explained that the Boeing partnership would have been offset by economic constraints, while partnership with Airbus Industrie would have been offset by political ones.

Mr Swartlow also argued that the 150-seat plane will solve the problem faced by Japanese companies (ANA, TOA) as the YS 11 is replaced by larger capacity planes, adding that the English-Japanese RJ 500 turbojet could be used to equip the 150-seat plane. However, it is noted that until now Rolls Royce and Japanese engine manufacturers have not yet taken steps toward making RJ 500 performance suitable for use in equipping the new plane. Japanese authorities do not seem likely to reach a decision on Mr Swartlow's suggestions before August.

McDonnell Douglas and Fokker have a launch target date such that the MDF-100 prototype will begin flight tests in 1983 and initial deliveries can take place in 1986.

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TRANSPORTATION

BRIEFS

DOWTY INVESTS IN EQUIPMENT--Dowty is participating in the production of the A310 landing gear, in cooperation with Messier-Hispano-Bugatti which is responsible for design and development. To this end Dowty is installing a plant in Cheltenham for landing gear production for the A310 as well as the BAe 146 and the AV 8 B. For this plant, Dowty has just acquired a Droop and Rhein six-spindle machine-tool which cost the round sum of 1.25 million pounds. Another one is on order. Dowty has also invested at least another million pounds in a thermal surface-treatment machine, still for landing gears. [Text] [Paris AIR & COSMOS in French 9 May 81 p 11] [COPYRIGHT: A. & C. 1980/ 11,023

SHORTS 360 ORDERS--The South American company Tavina (Colombia) has just ordered a Shorts 360 to be delivered in mid-1983. This makes 11 orders and options received by Short Brothers for this craft, and four customer accounts. It will be recalled that Shorts recently announced that the first flight for the prototype model 360 is now planned for July instead of December, which means a six-month gain on the initial schedule. This also means a one-third reduction in the construction schedule for the first aircraft. The plane will thus undergo its testing with Pratt and Whitney PT6A-45 engines which can be replaced only subsequently by the new PT6A-65R's; the latter, which will equip the mass-produced planes, are only now beginning to perform their first flights on planes at the engine manufacturers. It must also be remembered that the first Shorts 360 will go into service at the end of 1982 with the American company Suburban Airlines, which announced four initial orders last September. [Text] [Paris AIR & COSMOS in French 16 May 81 p 25] [COPYRIGHT: A. & C. 1980/ 11,023

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